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# Chitosan dispersed PLA films for high gas barrier applications: An industrially viable approach

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Biopolymers can be utilized to improve gas barrier properties of synthetic biodegradable polymers if it is dispersed effectively into the polymer matrix. Chitosan, a co-polymer of D-glucosamine and N-acetyl-D-glucosamine, is one of the versatile biopolymer which can be utilized in various applications such as food packaging, biomedical, drug delivery, etc. In the present study, poly (lactic acid) (PLA)/grafted chitosan bio-nanocomposite films (PLA/GCH) have been prepared by solution casting as well as melt extrusion based industrially viable technique to achieve targeted barrier, thermal and mechanical properties. FESEM and TEM analysis confirms the grafted chitosan is homogeneously dispersed in PLA matrix and forms core-shell morphology which helps in dispersion of chitosan in PLA matrix. In result of chitosan master batch treatment in PLA matrix, oxygen permeability (OP) reduces up to 10 folds than that of neat PLA. The ultimate tensile strength (UTS) and young's modulus (YM) decrease up to 18% and 55% respectively but percentage elongation (%E) has been improved drastically up to 386% with increasing filler concentration.

## Biography

Vimal Katiyar is currently working as Associate Professor in Department of Chemical Engineering at Indian Institute of Technology Guwahati, India. He has more than 25 international publications and patents on poly lactic acid based technology in diversified area such as specialization in polylactic acid synthesis, industrial level films and nanocomposites processing, biopolymer based nanofillers, migration, polymer modeling and polymer characterization. He is Team Leader of Center of Excellence for Sustainable Polymers at IIT Guwahati.

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